

BAB VII

PERHITUNGAN SAMBUNGAN BALOK B3 DENGAN KOLOM K

7.1 Sambungan Balok B3 dengan Kolom K

Output Gaya Maksimum pada Sambungan hasil ETABS

$M_u := 19437.2 \text{ kgm}$

$P_u := 901.32 \text{ kg}$

Direncanakan baut HTB $\phi 16$ BJ 41

$f_{ub} := 4100 \text{ kg/cm}^2$

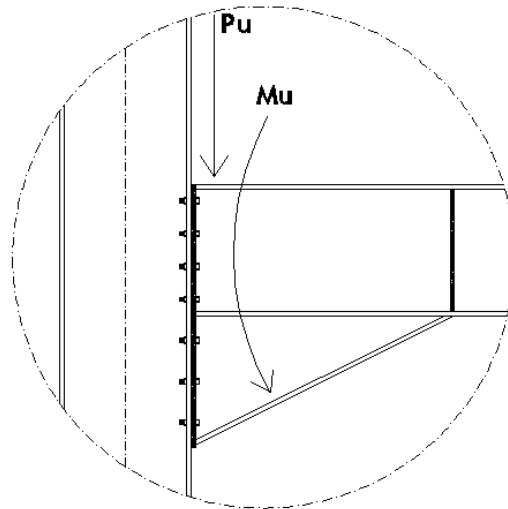
$\Phi_{\text{baut}} := 16 \text{ mm}$

$A_b := \frac{\pi}{4} \cdot 1.6^2 = 2.011 \text{ cm}^2$

Pelat penyambung BJ 37

$f_u := 3700 \text{ kg/cm}^2 \quad t_p := 10 \text{ mm}$

$f_y := 2400 \text{ kg/cm}^2$



- Kontrol Geser

Direncanakan baut HTB 14 $\phi 16$

$V_u := \frac{P_u}{14} = 64.38 \text{ kg}$

$f_{uv} := \frac{V_u}{A_b} = 32.02 \text{ kg/cm}^2 \quad \blacksquare \leq \blacksquare \quad 0.5 \cdot 0.75 \cdot f_{ub} \cdot 1 = 1537.5 \text{ kg/cm}^2 \quad \text{OK!!}$

- Beban Tarik (interaksi geser dan tarik)

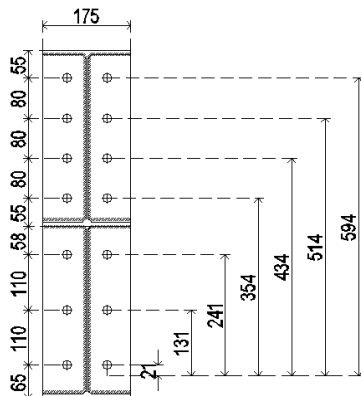
$f_t := (1.3 \cdot f_{ub} - 1.0 \cdot f_{uv}) = 5297.98 \text{ kg/cm}^2 \quad \blacksquare \geq \blacksquare \quad f_{ub} = 4100 \text{ kg/cm}^2$

$f_t := f_{ub} = 4100 \text{ kg/cm}^2$

$T_d := 0.75 \cdot f_{ub} \cdot A_b = 6182.654 \text{ kg}$

Mencari garis netral ----> anggap dibawah baut terbawah

$a := \frac{14 \cdot T_d}{17.5 \cdot 2400} = 2.06 \text{ cm} \quad \blacksquare \leq \blacksquare \quad 6.5 \text{ cm} \quad \text{OK!!}$



Momen rencana yang dapat dipikul sambungan

$$\Phi M_n := \frac{\left[\left(0.9 \cdot 2400 \cdot a^2 \cdot \frac{20}{2} \right) + 2 \cdot T_d \cdot (2.1 + 13.1 + 24.1 + 35.4 + 43.4 + 51.4 + 59.4) \right]}{100} = 29221.597 \quad \text{kgm}$$

$$\Phi M_n = 29221.597 \quad \text{kgm} \quad \blacksquare \geq \blacksquare \quad M_u = 19437.2 \quad \text{kgm}$$

- **Sambungan Pelat dengan Balok (Sambungan Las)**

Digunakan las F_{E70XX}

Tebal las $t_e := 1 \quad \text{cm}$

Profil balok B5 WF 350 x 175 x 7 x 11 BJ 37

$$h := 350 - 2 \cdot (11 + 14) = 300 \quad \text{mm}$$

$$\text{Alas} := 2 \cdot (30 + 17.5) \cdot 1 = 95 \quad \text{cm}^2$$

$$I_p := 2 \cdot \left[\left(\frac{1}{12} \cdot 30^3 \right) + \left[1 \cdot 95 \cdot \left(\frac{35}{2} \right)^2 \right] \right] = 62687.5 \quad \text{cm}^4$$

Akibat beban geser sentris

$$P_u = 901.32 \quad \text{kg}$$

$$f_u := \frac{P_u}{\text{Alas}} = 9.488 \quad \text{kg/cm}^2$$

Akibat beban momen lentur

$$M_u = 19437.2 \quad \text{kgm}$$

$$S_x := \frac{I_p}{17.5} = 3582.143 \quad \text{cm}^3$$

$$f_h := \frac{M_u \cdot 100}{S_x} = 542.614 \quad \frac{\text{kg}}{\text{cm}^2}$$

$$f_{\text{tot}} := \sqrt{f_u^2 + f_h^2} = 542.697 \quad \frac{\text{kg}}{\text{cm}^2}$$

Kekuatan rencana las

$$\Phi f_n := (0.75 \cdot 0.6 \cdot 70 \cdot 70.3) = 2214.45 \quad \frac{\text{kg}}{\text{cm}^2}$$

$$f_{\text{total}} < \Phi f_n$$

$$\text{teperlu} \geq \frac{f_{\text{tot}}}{\Phi f_n} = 0.245 \quad \text{cm}$$

$$\text{aperlu} \geq \frac{0.245}{0.707} = 0.347 \quad \text{cm}$$

Syarat :

$$a_{\text{min}} := 4 \quad \text{mm} \quad (t = 10 \text{ mm})$$

$$a_{effmax} := 0.707 \cdot \frac{3700 \cdot 0.8}{70 \cdot 70.3} = 0.425 \text{ cm (las di badan)}$$

$$a_{effmax} := 1.41 \cdot \frac{3700 \cdot 1.3}{70 \cdot 70.3} = 1.378 \text{ cm (las di daun)}$$

maka dipakai $a = 4 \text{ mm} > a_{perlu} = 3.47 \text{ mm}$

- **Kontrol Pelat Sambung**

Pelat penyambung BJ 37

Direncanakan baut BJ 37

$$f_u := 3700 \text{ kg/cm}^2$$

$$f_{ub} := 3700 \text{ kg/cm}^2$$

$$f_y := 2400 \text{ kg/cm}^2$$

$$d_b := 1.6 \text{ cm}$$

$$t_p := 1 \text{ cm}$$

$$A_b := \frac{\pi}{4} \cdot 1.6^2 = 2.011 \text{ cm}^2$$

Luas bidang geser

$$L := 35 \text{ cm}$$

$$A_{nv} := (L - 4 \cdot d_b) \cdot t_p = 28.6 \text{ cm}^2$$

Kuat Rencana

$$\Phi P_n := 0.75 \cdot (0.6 \cdot f_u \cdot A_{nv}) = 47619 \text{ kg} \quad \blacksquare > \blacksquare \quad P_u = 901.32 \text{ kg}$$